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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/545,436	04/07/2000	Gregory Prestas	PTI-108	9813
25096	7590	04/20/2004	EXAMINER	
PERKINS COIE LLP			VOLPER, THOMAS E	
PATENT-SEA			ART UNIT	
P.O. BOX 1247			2665	
SEATTLE, WA 98111-1247			PAPER NUMBER	

DATE MAILED: 04/20/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/545,436

Applicant(s)

PRESTAS ET AL.

Examiner

Thomas Volper

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicants' arguments filed 29 January 2004 have been fully considered but they are not persuasive.

In response to Applicants' argument that a major difference between the present invention and the Blumenau reference is that the present invention "uses an intelligent intermediary having a virtual connection manager and a virtual connection cache" while the Blumenau reference "neither teaches nor suggests the use of an intermediary", the Examiner respectfully disagrees. The Examiner also respectfully disagrees with Applicants' argument that Blumenau fails to provide "virtual connections". Figure 1 of the Blumenau reference shows a storage controller (27) that acts as an intermediary between a host (22-25) and a storage volume (28-31). As mentioned in the previous Office action, the storage controller acts as a virtual connection manager, as in the present invention. The storage controller manages memory that contains information about the mapping of virtual ports to storage volumes. These mappings represent virtual connections. As stated by Applicants (2nd paragraph under "Analysis" heading), "A virtual connection represents a connection between a specific host initiator and a specific logical or physical target device." Blumenau discloses a volume access and mapping information (246 or 269) that uses stored virtual connection information to validate subsequent requests for access (col. 23, line 62 – col. 24, line 27). The mapping information includes a virtual port mapping table (282) that stores a HOST INDEX to a particular host controller port associated with a particular virtual port, and a mapping of the logical storage volumes accessible

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from the virtual port (col. 24, line 61 – col. 25, line 9). This virtual port mapping table clearly identifies a specific host initiator and associated specific logical target devices, as described by Applicants. Pursuant to the above description of the volume access and mapping information (246 or 269), which is maintained in memory (236), the mapping information suffices the limitation of a virtual connection cache.

In response to Applicants' argument that the Blumenau technique contrasts with the present inventive technique because Blumenau requires checking an access table with every access request as opposed to a virtual connection manager examining a virtual connection cache to determine whether the command should be forwarded to the target device, the Examiner respectfully disagrees. As described in the previous paragraph, the invention of Blumenau uses a memory to store information about connections between host devices and logical volumes. This has been equated with the virtual connection cache of the present invention. There is no functional difference between the checking of virtual connection mapping information in the memory of Blumenau and the examining of a virtual connection cache of the present invention.

Applicants' arguments fail to overcome the 35 U.S.C. 102(e) rejection of claims 1-23 based on Blumenau et al., thus this action is deemed final.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an

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international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-26 are rejected under 35 U.S.C. 102(e) as being anticipated by Blumenau et al. (US 6,493,825).

Regarding claims 1 and 24-26, Blumenau discloses a virtual connection architecture and a host initiator (see Figure 22). The architecture includes a storage controller (27), which represents the virtual connection manager of the present invention. Also present in the architecture is a volume access and mapping information (269), representing the virtual connection cache of the present invention, that includes a virtual port mapping table (282). The virtual port mapping table stores rows that each include a V_PORT_ID of the virtual port, a HOST INDEX to a particular host controller port associated with the virtual port, and a LUN (logical unit number) TO LOGICAL VOLUME MAP, which is a mapping of the logical storage volumes accessible from the virtual port (col. 24, line 61 – col. 25, line 9). The mappings stored in this information represent virtual connections. Blumenau also discloses a list of allowable connections (283) (see Figure 23). Blumenau discloses a process of requesting access to a virtual port from a host, indexing a virtual port mapping table with the host_index, matching S_IDs of the request with a table entry, determining whether a match is made and accessing a private volume. The volume accessed by the host may be accessed by a LUN (col. 26, line 32 – col. 27, line 35; also see Figures 27 and 28). Blumenau also discloses creating a new connection when no previously established connection exists or when a change in mapping is required (col. 30, line 63 – col. 31, line 13).

Regarding claim 2, Blumenau discloses the ability to have simultaneous multi host access (col. 42, lines 30-33).

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Regarding claim 3, Blumenau discloses connecting to a storage subsystem via a switch that connects a number of loops to the storage subsystem (col. 40, lines 17-39; also see Figure 38). Each of these loops represents a common physical data channel because there are multiple hosts on each loop.

Regarding claim 4, Blumenau discloses that encryption is used for data transfer between a host and a data processing device (see Abstract). Encryption provides a protected end-to-end data path

Regarding claim 5, Blumenau discloses switches for connecting to a storage subsystem (see Figure 38)

Regarding claim 6, Blumenau discloses a private/shared flag that determines which way the access process will branch based on whether the flag is set (col. 27, lines 30-51). Private and shared represent the different levels of access permission.

Regarding claims 7 and 8, Blumenau discloses a memory (236) that includes volume access and mapping information (246) for storing information about the connections between hosts and storage volumes (col. 23, lines 20-37; also see Figure 21). Also, volume access and mapping information (269) is of a similar format (col. 23, lines 62-65; also see Figures 22 and 23). The volume access and mapping information (246 or 269) represents the virtual connection cache of the present invention.

Regarding claim 9, Blumenau discloses using stored virtual connection information to validate subsequent requests for access (col. 23, line 62 – col. 24, line 27).

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Regarding claim 10, Blumenau discloses a storage controller (27) for controlling access of the hosts to the storage volumes (26) (col. 5, lines 58-63). This storage controller represents the virtual connection manager of the present invention.

Regarding claim 11, Blumenau discloses no need to alter an existing operating system in any way.

Regarding claims 12 and 13, Blumenau discloses volume and access mapping information (269), which will only connect a host to a particular volume if it has permission to access that volume (col. 23, line 62 – col. 24, line 27). This security feature clearly works independently from the security of the individual host and any attached storage devices.

Regarding claim 14, Blumenau discloses that the storage devices may be magnetic disk drives, optical disk drives, tape drives, solid-state memory devices, or other storage devices (col. 5, lines 65-67).

Regarding claim 15, Blumenau discloses that the links between the storage adapters and storage devices may be SCSI or Fibre Channel fiber-optical loops (col. 7, lines 1-7).

Regarding claim 16, Blumenau discloses a plurality of hosts connected to the virtual SAN (see Figure 21). It is inherent that there is an interface between each host and the network (21) otherwise there would be no way to transfer information between the storage devices and the hosts.

Regarding claim 17, Blumenau discloses a graphical user interface (GUI) that permits the system administrator to set up password protection, to modify a host's volume configuration, or to read and write the physical and virtual port names of storage subsystem as defined in a configuration database (col. 28, line 64 – col. 29, line 10). This GUI represents the registration

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engine of the present invention. The GUI is able to recognize an "Install" command when a new host controller port is introduced. This command writes the host's configuration information into the volume configuration database (col. 29, lines 11-14). This "Install" command represents the registration command of the present invention.

Regarding claim 18, Blumenau discloses that the GUI may recognize a "remove from service" command to remove a host or host controller from service (col. 29, lines 33-37). This represents the de-registration command of the present invention.

Regarding claim 19, Blumenau discloses a host controller on each host (see Figure 21). The host controller represents the registration service of the present invention.

Regarding claim 20, Blumenau discloses that the GUI may recognize a "Configuration" command to enter or modify a host's volume configuration information (col. 29, lines 28-32).

Regarding claim 21, Blumenau discloses that the Fibre Channel specifications provide a mechanism for the network to automatically detect certain changes of state, which may indicate that the configuration of the system has changed, such as link failure (col. 10, lines 38-51). It is inherent that in order to automatically detect any changes, the network must have been monitoring the network for changes. Link failure is an indication of the health status of a host.

Regarding claim 22, Blumenau discloses that topology reconfiguration occurs whenever a connection is added, deleted or modified in the data network. This may occur when the S_ID of a host controller port changes. The ports should login to the data storage subsystem to register the new S_IDs (col. 30, lines 63-67). This represents issuance of a periodic registration command, since it was cited earlier that in order to register a new host controller port, the GUI must receive an "Install" command.

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Regarding claim 23, Blumenau discloses that the relationship between each host and the volumes assigned to the host are re-established automatically (col. 12, lines 54-66).

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

5. Any inquiry concerning this communication, or earlier communications from the examiner should be directed to Thomas Volper whose telephone number is 703-305-8405 and fax number is 703-746-9467. The examiner can normally be reached between 8:30am and 6:00pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu, can be reached at 703-308-6602. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4750.

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Thomas E. Volper

TEV

April 13, 2004

A handwritten signature in black ink, appearing to read 'Huy D. Vu', with a long horizontal flourish extending to the right.

HUY D. VU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600